



**ALLIED MACHINE
& ENGINEERING**

WOHLHAUPTER®

Holemaking Solutions for Today's Manufacturing



Drilling



Reaming



Burnishing



Threading



Specials



Wohlhaupter®

▶ **BORING**

Combi-Line Rough and Finish Boring Tools

WOHLHAUPTER®

SECTION

B10-C

Combi-Line Rough and Finish Boring

Wohlhaupter® Rough and Finish Boring

Combi-Line

▶ Diameter Range: 24.50 mm - 201.00 mm



One tool. Two operations.

The Wohlhaupter Combi-Line combines both rough and finish boring into one operation. The front insert holder is the roughing cutting edge while the shorter holder finishes the hole, saving you time and money.

Your safety and the safety of others is very important. This catalogue contains important safety messages. Always read and follow all safety precautions.



This triangle is a safety hazard symbol. It alerts you to potential safety hazards that can cause tool failure and serious injury.

When you see this symbol in the catalogue, look for a related safety message that may be near this triangle or referred to in the nearby text.

There are safety signal words also used in the catalogue. Safety messages follow these words.

WARNING (shown above) means that failure to follow the precautions in this message could result in tool failure and serious injury.

NOTICE means that failure to follow the precautions in this message could result in damage to the tool or machine but not result in personal injury.

NOTE and **IMPORTANT** are also used. These are important that you read and follow but are not safety-related.

Visit www.alliedmachine.com for the most up-to-date information and procedures.

Applicable Industries



Aerospace



Agriculture



Automotive



Firearms



General
Machining



Oil & Gas

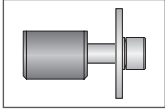


Renewable
Energy

Combi-Line Rough and Finish Boring Table of Contents

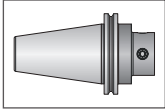
Reference Icons

The following icons will appear throughout the catalogue to help you navigate between products.



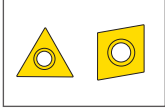
Clamping Elements

For use with insert holders and boring heads



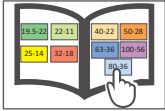
Shanks

A variety of shanks for different machines



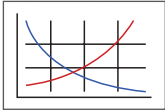
Inserts

For use with insert holder boring heads and boring bars using indexable inserts



MVS Connection Colour Guide

Detailed instructions and information regarding the MVS connection(s)



Recommended Cutting Data

Speed and feed recommendations for optimum and safe boring



Through Coolant Option

Indicates that the product is through coolant

Combi-Line Introduction

Product Overview	2 - 3
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Series	Diameter Range
	Metric (mm)
Combi-Line 401	24.50 - 201.00

Combi-Line Product Overview

Combi-Line ROUGH & FINISH BORING

Two Operations. One Tool.

Decrease cycle time and tool changes with the Wohlhaupter Combi-Line. The Combi-Line combines rough and finish boring into one tool with height displaced insert holders.

Reduce your *cycle time* with the Combi-Line.

- Diameter range: 24.50 mm - 201.00 mm.
- Reduce cycle and tool changing time.
- Available in semi-standard same level or height displaced insert holders.
- Through coolant.
- 0.002 mm vernier adjustment on finishing insert holder.
- Max spindle speed: 1524 m/min.



IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-M: 12 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
email: engineering.eu@alliedmachine.com

Cycle time is crucial. Why not choose the best process?

Application: Ductile Cast Iron

Finish Diameter: 50 mm (+/- 0.013 mm)

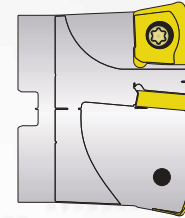
Pre-Hole Diameter: 45 mm

Boring Depth: 209 mm

Hole Finish: 0.8 Ra



Measure	1st Process Option	
	Step 1 Rough 49 mm Competitor 1.5" High Feed Milling Tool	Step 2 Finish 50 mm Wohlhaupter 310 Boring Head
Speed	2500 RPM	1165 PRM
Feed Rate	3886.2 mm/min	11.8 mm/min
Total Passes	77	1
Cycle Time (per hole)	1.93 min	1.77 min
Tool Change Time	15 sec	
Cycle Time (per part)	3 min 54 sec	



1.5" High Feed Milling Tool



Wohlhaupter 310 Boring Head

Measure	2nd Process Option	
	Step 1 Rough 49 mm Wohlhaupter Twin Cutter at 49 mm Ø	Step 2 Finish 50 mm Wohlhaupter 310 Boring Head
Speed	990 RPM	1165 PRM
Feed Rate	301.88 mm/min	11.8 mm/min
Total Passes	1	1
Cycle Time (per hole)	0.69 min	1.77 min
Tool Change Time	15 sec	
Cycle Time (per part)	2 min 46 sec	



Wohlhaupter Twin Cutter



Wohlhaupter 310 Boring Head

OUR **SOLUTION**

Combi-Line Rough and Finish Boring

Measure	3rd Process Option Finish 50 mm Wohlhaupter Combi-Line
Speed	1165 RPM
Feed Rate	11.8 mm/min
Total Passes	1
Cycle Time (per hole)	1.77 min
Tool Change Time	0
Cycle Time (per part)	1 min 46 sec ←

- ▶ Combi-Line assembly:
 - (1) Insert holders (x2): 402021
 - (2) Serrated tool body: 404006
 - (3) Shank: 353014

- Boring inserts
 - ▶ Item No. 297653WHC19



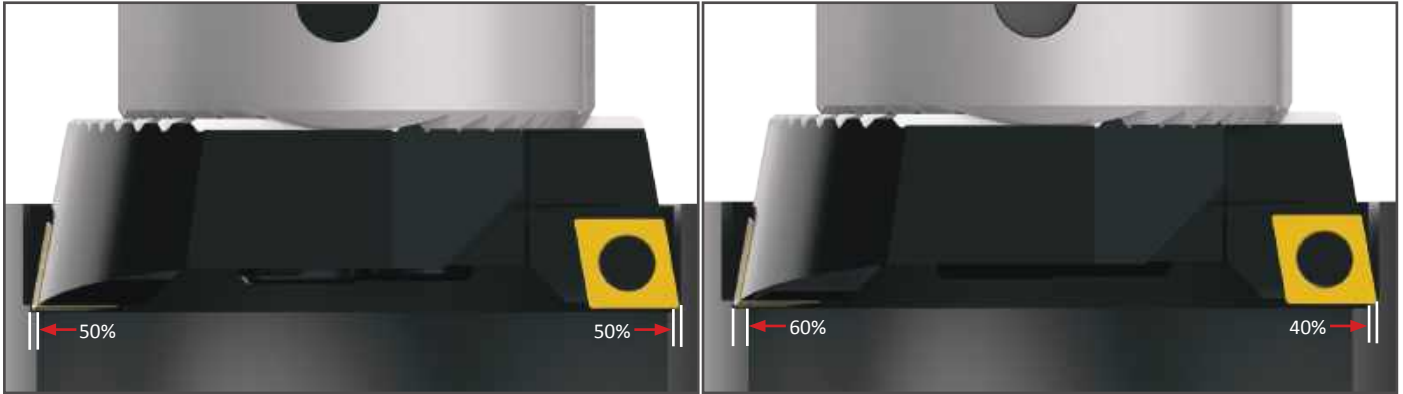
60 seconds of total cycle time saved



1 tool vs. 2 tools saves you time and money

Material Removal Percentages | Tool Usage

Material Removal Percentages



Material removal up to 4.00 mm on diameter: **50% roughing 50% finishing**

Material removal up to 4.00 mm - 7.00 mm on diameter: **60% roughing 40% finishing**



Material removal up to 7.00 mm - 10.00 mm on diameter: **70% roughing 30% finishing**

- For tools with a length-to-diameter ratio greater than 4:1, the existing hole diameter should be no more than 4.00 mm smaller than the finish diameter. The 50% roughing and 50% finishing rule should be applied.
- When boring with severe interruptions, the existing hole diameter should be no more than 4.00 mm smaller than the finish diameter. The 50% roughing and 50% finishing rule should be applied.

IMPORTANT: Consult application engineering for technical support when using Combi-Line tools in holes with interruptions.
email: engineering.eu@alliedmachine.com

Tool Usage

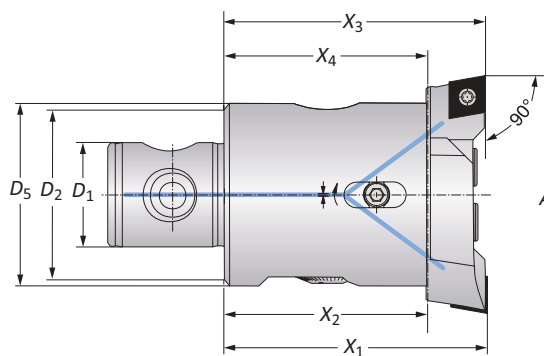
- For most applications, the same inserts should be used in both the roughing and finishing insert holders.
- To insure proper chip breaking, the finishing insert holder DOC must be at least 0.50 mm.
- Up to a 4:1 length-to-diameter ratio, standard insert holders with a height displacement of up to 0.30 mm can be used.
- Inserts with wiper geometry are recommended only for special Combi-Line applications.

Boring Heads and Insert Holders

Diameter Range: 24.50 mm - 201.00 mm



COMBI LINE



Connection	Boring Range	Boring Head					Weight	Insert Form	Part No.		
		$D_2 D_1$	A	X_1	X_3	X_2			X_4	D_5	(x2)* Insert Holder**
m	22 - 11	24.50 - 29.50	46.00	45.75	34.00	33.75	-	0.10 (kg)	101	402029	401003
	25 - 14	29.00 - 37.00	56.00	55.75	41.00	40.75	26.00	0.20 (kg)	101	402009	401004
	25 - 14	29.00 - 37.00	56.00	55.75	41.00	40.75	26.00	0.20 (kg)	103	402011	401004
	25 - 14	36.00 - 44.00	56.00	55.75	41.00	40.75	30.00	0.30 (kg)	101	402017	401005
	25 - 14	36.00 - 44.00	56.00	55.75	41.00	40.75	30.00	0.30 (kg)	103	402019	401005
	32 - 18	43.00 - 54.00	66.00	65.70	48.00	47.70	34.00	0.40 (kg)	103	402021	401006
	40 - 22	53.00 - 66.00	75.00	74.70	55.00	54.70	-	0.70 (kg)	103	402005	401007
	50 - 28	65.00 - 83.00	75.00	74.70	55.00	54.70	-	1.10 (kg)	103	402013	401008
	63 - 36	82.00 - 103.00	90.00	89.70	70.00	69.70	-	2.20 (kg)	103	402001	401009
	80 - 36	102.00 - 127.00	90.00	89.70	66.00	65.70	85.00	3.00 (kg)	103	402025	401010
80 - 36	127.00 - 152.00	90.00	89.70	66.00	65.70	85.00	3.10 (kg)	103	402026	401010	
80 - 36	151.00 - 176.00	90.00	89.70	66.00	65.70	134.00	3.80 (kg)	103	402025	401011	
80 - 36	176.00 - 201.00	90.00	89.70	66.00	65.70	134.00	3.90 (kg)	103	402026	401011	

*(2) insert holders are required.
**Insert holders sold individually.

Key on B10-C: 1

B10-M: 12-13

B10-C: 6

B10-F

B10-H

B10: VI-VII

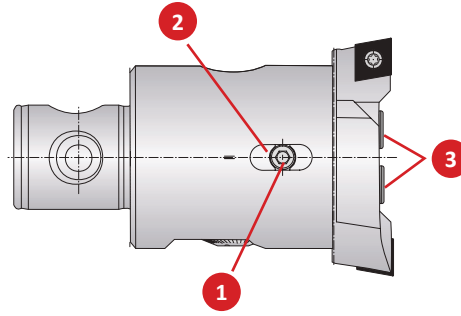
m = Metric (mm)

Inserts sold separately

IMPORTANT: Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-M: 12 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
email: engineering.eu@alliedmachine.com

Accessories

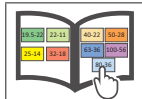
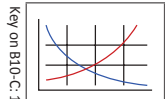
Screws | Clamping Elements



Boring Head Part No.	1. Clamp Screw		2. Clamping Piece	3. Cap Screw	
	Part No.	Service Key		Part No.	Part No.
401003	401223	s2.5 / A	–	401323	s3 / B
401004	401224	s2.5 / B	401204	401324	s4 / B
401005	401225	s2.5 / B	401205	401324	s4 / B
401006	401226	s3 / B	401206	401324	s4 / B
401007	401227	s3 / B	401207	401327	s5 / B
401008	115288	s4 / B	401208	401329	s6 / B
401009	215501	s4 / B	401209	401329	s6 / B
401010	401230	s4 / B	401210	019183	s8 / C
401011	401230	s4 / B	401210	019183	s8 / C

B10-M: 12-13

B10: VI-VII



Guaranteed Test / Demo Application Form

Distributor PO #	
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The following must be filled out completely before your test will be considered

IMPORTANT: For processing, send purchase order to your Allied Field Sales Engineer (FSE). Please clearly mark the paperwork as "Test Order."

Distributor Information

Company Name: _____
 Contact: _____
 Account Number: _____
 Phone: _____
 Email: _____

End User Information

Company Name: _____
 Contact: _____
 Industry: _____
 Phone: _____
 Email: _____

Current Process

List all tooling, coatings, substrates, speeds and feeds, tool life, and any problems you are experiencing

Test Objective

List what would make this a successful test (i.e. penetration rate, finish, tool life, hole size, etc.)

Application Information

Hole Diameter: _____ in/mm	Tolerance: _____	Material: _____ (4150, A36, cast iron, etc.)
Pre-existing Diameter: _____ in/mm	Depth of Cut: _____ in/mm	Hardness: _____ (BHN, Rc)
Required Finish: _____ RMS	State: _____	(Casting, hot rolled, forging)

Machine Information

Machine Type: _____ (Lathe, screw machine, machine center, etc.)	Builder: _____ (Haas, Mori Seiki, etc.)	Model #: _____
Shank Required: _____ (CAT50, Morse taper, etc.)		Power: _____ HP/KW
Rigidity: _____	Orientation: _____	Tool Rotating: _____
<input type="checkbox"/> Excellent	<input type="checkbox"/> Vertical	<input type="checkbox"/> Yes
<input type="checkbox"/> Good	<input type="checkbox"/> Horizontal	<input type="checkbox"/> No
<input type="checkbox"/> Poor		Thrust: _____ lbs/N

Coolant Information

Coolant Delivery: _____ (Through tool, flood)	Coolant Pressure: _____ PSI / bar
Coolant Type: _____ (Air mist, oil, synthetic, water soluble, etc.)	Coolant Volume: _____ GPM / LPM

Requested Tooling

QTY	Item Number

QTY	Item Number

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ALLIED MACHINE & ENGINEERING



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Warranty Information



Allied Machine & Engineering (“Allied Machine”) warrants to original equipment manufacturers, distributors, industrial and commercial users of its products for one year from the original date of sale that each new product manufactured or supplied by Allied Machine shall be free from defects in material and workmanship.

Allied Machine’s sole and exclusive obligation under this warranty is limited to, at its option, without additional charge, replacing or repairing this product or issuing a credit. For this warranty to be applied, the product must be returned freight prepaid to the plant designated by an Allied Machine representative and which, upon inspection, is determined by Allied Machine to be defective in material and workmanship.

Complete information as to operating conditions, machine, setup, and the application of cutting fluid should accompany any product returned for inspection. This warranty shall not apply to any Allied Machine products which have been subjected to misuse, abuse, improper operating conditions, improper machine setup or improper application of cutting fluid or which have been repaired or altered if such repair or alteration, in the judgement of Allied Machine, would adversely affect the performance of the product.

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Allied Machine shall not be liable in contract or in tort (including, without limitation, negligence, strict liability or otherwise) for economic losses of any kind or for any special, incidental, indirect, consequential, punitive or exemplary damages arising in any way out of the performance of, or failure to perform this agreement.

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